# THE ENERGY AND ENVIRONMENT INTERFACE: A SUSTAINABLE DEVELOPMENT PERSPECTIVE

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### ABSTRACT

This paper considers the energy and environmental interface in terms of the broader issue of sustainable development. The paper draws from experience in the resource industry in general and then focuses on the coal industry.

The paper includes:

- Thoughts on resource extraction and sustainability and the implications of the differences in perceptions from within the industry and by others.
- A description of the Global Mining Initiative – this is a program to reach a shared understanding of the positive role of the minerals industry in making the transition to sustainable patterns of economic development.
- Considerations on sustainable development and coal's important role in global and APEC energy supplies – coal presents an excellent case study of the challenges presented by sustainable development.
- An outline of several Australian initiatives to improve the understanding of coal's role in sustainable development and to improve its environmental performance.
- Observations on the need for science and technology to work closely with the wider community in developing options for the future.

The paper concludes that there is an essential ongoing role for coal in the foreseeable future because of its strong contribution to the social and economic components of sustainable development. Commercially available technologies allow coal to meet the most stringent current environmental standards. However, further development and commercial deployment of technologies that significantly reduce greenhouse gas emissions from coal production presents a significant long-term challenge.

### 1 INTRODUCTION

This paper considers the interface of energy and the environment in the wider context of sustainable development. After considering the issue from the broader perspective of the resources industry, the paper focuses on coal and the environment.

There are four related topics:

- The source of and implications of differing perceptions from within the industry and by others about energy supply and its impacts.
- A brief description of the Global Mining Initiative – this is a program to reach a shared understanding of the positive role of the minerals industry in making the transition to sustainable patterns of economic development.

- Sustainability and global energy supplies – coal presents an excellent case study of the challenges presented by the goal of sustainable development and the importance of considering environmental impacts.

- A description of Australian initiatives to better understand coal's role in sustainable development and to improve its environmental performance.

## 2 SUSTAINABILITY AND RESOURCE INDUSTRIES

The resource industries, despite the very substantial benefits they bestow on society, stir strong emotions. Sometimes poor perceptions are justified – some past practices were clearly unsatisfactory by today's standards and there are still examples of unacceptable operations.

Despite vastly improved environmental and social performance and efforts to engage its critics, resource industries are encountering increasing public disfavour. Many people accept them grudgingly as a necessary evil. Others take as read that the assertion that they are incompatible with sustainable development. There is a gulf between the industries' self-perception and how some others see them.

At the heart of the term sustainable development, there is a clear understanding about the three key elements of the process of moving towards a sustainable society:

(i) economic activity should be considered together with its social and environmental consequences,
(ii) in using resources we have to have regard for future generations and
(iii) government, business and other stakeholders will need to act together if they are to be effective.

Put in other words, sustainable development seeks to maximise goal attainment across all the ecological, economic and social systems. This process of maximising the overall benefit requires a continuing and adaptive process of trade offs between all three systems.

Despite the underlying wisdom of sustainable development, when the extraction and consumption of finite resources are involved, there are two contrasting interpretations.

- One view is that a characteristic of sustainable development must be a rapid reduction in the extraction of non-renewable resources.
- The other is that continued extraction of non-renewable resources is a necessary part of sustainable development activities.

This difference arises because self-perceptions of organisations and individuals about their roles in society influence their views of sustainability[1]. We should not expect to achieve unanimity on the role of the resource industries, but we should work towards a better-informed debate. There will always be some people who argue that they can do without resource industries. The vast majority of people know that they have an essential role in sustaining economic development. They just want those industries to go about their business in a less damaging way.

Corporations cannot stand apart from society's concerns. Apart from the ethical considerations, it is simply good business to respond effectively. Industries in the future will be assessed not only on their economic performance but also their environmental and social performance – that is, their contribution to sustainable development.

## 3 GLOBAL MINING INITIATIVE[2]

A recent resource industry initiative provides some insights. Chief executive officers of nine leading international mining companies have formed the Global Mining Initiative (GMI). This is a wide-ranging and participative program of analytical work, involving leading think tanks, academic

[1] Cowell et al, Sustainability and the primary extraction industries: theories and practice. Resources Policy 25 (1999) 277-286
[2] See www.globalmining.com

researchers and non-government organisations. It has been commissioned through the World Business Council for Sustainable Development[3].

The GMI will lead up to a major conference on Mining and Sustainable Development in March 2002. This conference will be a significant contribution to the events that will mark the 10th anniversary of the Rio Earth Summit.

The GMI's objective is to reach a shared understanding of the positive role the mining and minerals industry can play in making the transition to sustainable patterns of economic development. The mining industry cannot answer this question itself. It needs to listen to, learn from and engage all key non-mining stakeholders so that it better understands the linkages between industry and sustainable development. Then it will have to convert this knowledge into practical programs and applications.

A major program within the GMI is an independent analysis of the issues that the industry faces. This program, *Mining, Minerals and Sustainable Development*, is independently managed by the International Institute for Environment and Development (IIED)[4], with the aim of bringing a wide range of sponsors into the process. Its aim is to generate a broadly based and authoritative analysis of the issues for the minerals industry that arise from people's expectations of sustainable development.

The GMI analysis will be conducted at arm's length from industry and will involve broad participation by people with whom the industry must engage as it conducts its affairs. The broader Sponsoring Group includes 27 companies. An Assurance Group of respected individuals from stakeholder groups will provide a high-level peer review and an independent Work Group will bring together the necessary expertise and links with other centres of excellence.

The Global Mining Initiative is an example of an industry planning for a more sustainable future – working together and with others to understand the issues and then deciding how to respond.

## 4 GLOBAL ENERGY SUPPLIES, COAL AND SUSTAINABILITY

### Coal's Global Role

One hundred years ago much of the industrial world was almost entirely dependent on coal. Since then coal's share of the primary energy market has declined for two reasons. First, oil became more widely available, and gas, nuclear energy and new non-fossil energy technologies were developed. Second, the composition of the end market changed, largely through the growth of personal transport and through widespread electrification.

This is good – the world now has a diversified energy economy with various primary energies being used where they are most suited. This transition has taken one hundred years. While coal's market share has fallen, global demand for coal has increased enormously due to its use in electricity generation and steel making.

Today, coal contributes about 27% of global primary energy demand, being second only to oil. Coal is used to produce 37% of the world's electricity. Coal is also a key requirement for two other building blocks of modern society – the production of cement and steel. Approximately 16% of world hard coal production is used to produce 70% of total global steel production.

However, adequate energy in all its forms, and the services it provides are not available to all. The world's industrialised economies, home to only 20% of the world's people, consume nearly 60% of the total energy supply. This contrasts with the other 80% that consume the remaining 40% of world energy. The World Energy Council (WEC) has identified that the immediate challenge in sustainable energy development is to provide these people with improved standard of living, education and health care through commercial energy services. The challenge is to provide these improved services consistent with the principles of sustainable development.

[3] See www.wbcsd.ch/
[4] See www.iied.org/mmsd/

### How does coal rate in sustainable development terms?

Clearly, on economic grounds, there is a compelling case for coal. World coal demand has grown by over one billion tonnes over the past two decades for very good reasons. Coal is the most abundant fossil fuel. It is widely dispersed, safe in transport, storage and use, cost-competitive and, when advanced technologies are used, coal is clean. Coal fares well also on social criteria, provided that modern standards of workplace health and safety are met during its extraction and use.

Where coal has sometimes been found wanting is its environmental performance. Coal's reputation was founded in the past where it was used without modern emission control technologies, resulting in adverse impacts on local and regional air quality. Unfortunately, there are more recent examples of poor practice that a far more newsworthy than is good environmental practice.

People enjoy the benefits that coal brings – but they do want it to do its job cleanly – and technologies are available to allow coal to meet the most stringent emissions standards, as in Japan, for example.

Despite coal's key role in the world economy and the availability of clean coal technologies, its future use is being questioned because of concerns over climate change and the continuing use of fossil fuels. A rapid withdrawal from the use of coal, as some advocate, is clearly not feasible. The World Energy Council, in its Statement 2000[5] does not anticipate any major changes in energy supply over the next 20 years that will provide a step change in the carbon intensity of the world's energy supply. This is because 20 years is too short a period for the development and wide deployment of new technologies, for changes in capital stock, for the development of different attitudes, and for behaviour patterns and institutional reforms to have a major impact.

There are technological options available to make coal use less greenhouse gas-intensive. These range from widely deploying best commercial practices in developing economies, to widely deploying high efficiency technologies and, longer term, by developing sequestration technologies for capturing carbon dioxide.

However, the industry and its customers need more than the chance to develop and deploy cleaner technologies. They also need to work with governments and the community to reach a common understanding of the role of coal and what needs to be done to improve its performance.

Sustainable APEC economies will use the "best mix" of all available energy supply options, fossil and non-fossil, as assessed by the three components of sustainable development – economic, environmental and social objectives. This mix may vary between individual economies and may vary over time, as circumstances and options change.

For many APEC economies, the issue for the foreseeable future is not whether or not to incorporate coal in that "best mix", but to ensure that in using coal environmental goals are met together with economic and social objectives.

## 5 AUSTRALIAN INITIATIVES

Recently, the Australian coal industry began to engage the public, discuss the issues that underlie the negativity towards coal, and to demonstrate, on quite clear environmental, economic, technical and social grounds, that coal has an important future role to play. The three initiatives are:

- the Coal Development Program
- Coal in a Sustainable Society
- the Cooperative Research Centre for Coal in Sustainable Development

[5] The full statement is available at www.worldenergy.org

## Coal Development Program

The recently launched Australian Coal Development Program is specifically designed to provide a consistent flow of facts about coal, its environmental performance, its contribution to economical energy production in Australia and its role in regional and rural Australia and the Asia-Pacific region – at all political levels and throughout the media. It is intended that this program will make available the facts about coal to help Australian policy makers and the community to make decisions about the responsible use of our natural resources.

## Coal in a Sustainable Society

Coal in a Sustainable Society (CISS) is a major program of life cycle analysis investigations and communication that will support the Coal Development Program. CISS is examining the cradle to grave, or full life cycle impacts, of current and developing technologies for electricity generation and iron making.

CISS's aims are to:

- Develop a better understanding of coal's role in energy supplies and iron making,
- Provide an input into national and international policy deliberations,
- Identify opportunities to improve the performance of coal,
- Provide a key element in the Coal Development Program.

The debate surrounding coal use needs to be shifted from the anecdotal and emotional to the analytical and systematic. CISS will achieve this by taking a total system approach, based on life cycle analysis principles and by including an analysis of economic, environmental and social factors.

CISS is not a mere public relations program. The driving ethic is transparent integrity – the bad will be reported with the good, improvement opportunities will be identified, assumptions clearly stated and the work will be internationally peer-reviewed.

The total budget for the two-year program is $AU 3 million. Funding is provided mainly through the Australian Coal Association's Research Program (ACARP), coal industry funds and from other international and Australian stakeholders. Research staffs at BHP's Minerals Research Centre in Newcastle, who are highly skilled in life cycle analysis, are undertaking the investigations.

CISS results[6] have shown that on a cradle to grave basis, coal is not as greenhouse unfriendly as commonly perceived. This is in part because many other technologies – renewable and non-renewable, have significant greenhouse impacts during other stages of their life cycle that are not considered in less exhaustive comparisons.

The results also show that new coal-based iron making processes have lower greenhouse emissions than the traditional blast furnace in cradle to grave terms. These processes are at least competitive with, and can surpass natural gas-based iron making technologies in greenhouse terms.

The results of CISS will directly feed into the messages that Australian Coal Development Program will be putting forward to government and the community and provide an improved basis for balanced decision making. Communications will be via an interactive web site, lectures, reference material and conference papers.

## The Cooperative Research Centre for Coal in Sustainable Development

CISS is an important first step, and will help understand and communicate coal's present performance and identify improvement opportunities. But CISS it is not a vehicle for undertaking the scientific investigations needed to overcome technical barriers.

[6] Results of initial ACARP-funded investigations are available on www.sustainabletechnology.com.au

Therefore, major Australian electricity generators, coal producers and the Australian Coal Association Research Program have recently lodged a bid for government support for a new $AU 50 million cooperative research centre (CRC). The proposed CRC, The CRC for Coal in Sustainable Development, would build on the very successful CRC for Black Coal Utilisation and enable the best coal researchers in Australia to work closely with industry and a group of external sustainability advisers.

The CRC's objective is to become a centre of excellence in the Asia-Pacific region, to assist with clean coal technology development and deployment and to advise on the use of coal to support the transition to a sustainable society.

## 6 CONCLUDING COMMENTS

There are several principles that relate to improving the energy and environmental interface.

- The first is the growing assertion of the right of people to participate in the decisions affecting their neighbourhoods and environments – whether local, regional, or global. Technologies will need to pass the collective assessment of all stakeholders if they are to be successful in the marketplace.

- Technologists need to be attuned to the needs, desires and perceptions of communities. This understanding cannot be achieved by working in isolation. While technology and science can provide technological alternatives for society to consider, ultimately the wider community will choose which ones to adopt. Factual and transparent communication between technology developers, users and communities is essential to ensure that these choices are well-informed ones.

- The enormity of the task of placing society on a more sustainable footing makes a compelling case for collaboration by all stakeholders. Collaboration by competitors in pre-competitive research with support by governments allows both risks and costs to be shared and pools the talents of the best people for the task.
- Some of the largest and most immediate gains for the global good are to be made by the successful deployment of advanced commercial technologies in developing economies. This may not be as glamorous as groundbreaking research and it certainly is not an easy undertaking, but this is where the lowest cost benefits for the greatest number are to be found.

- Finally, we need to bear in mind the enormous inertia in the complex and capital-intensive systems that provide energy services to the world economy. Significant change will take time.

Sustainable development presents a considerable challenge to the coal industry. The industry and its customers cannot successfully meet these challenges by continuing to do only what they have done in the past. The industry is therefore working harder at listening to; learning from, and engaging key stakeholders to better understand the linkages between the industry and sustainable development.

## LIST OF ACRONYMS

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| GMI | Global Mining Initiative |
| IIED | International Institute for Environment and Development |
| WEC | World Energy Council |
| CISS | Coal in a Sustainable Society |
| CRC | Cooperative Research Centre |
| ACARP | Australian Coal Associations Research Program |